



'Massive failure': Why are millions of people in Texas still without power?

Extreme cold winter weather led to power outages and rolling blackouts in Texas. Here's why it happened.

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Power outages across Texas have left millions of people in the dark and bitter cold this week amid an unprecedented winter storm that buried the state in snow and ice and brought single-degree temperatures.

Extreme energy demand and overloaded frozen utility plants are among the factors that led to the power outages, experts said.

"No matter which way you cut it, this is a massive failure for a grid and a state that holds up energy and electricity as a shining example," said Varun Rai, director of the Energy Institute at the University of Texas-Austin.

Nearly 4.5 million customers went without electricity Tuesday, and by Wednesday over 3.3 million Texans still didn't have the lights turned on, according to poweroutage.us.

The country is divided into three grids: one covers the eastern USA, another the western states and there is the Texas grid, which covers nearly the entire state.

The Electric Reliability Council of Texas, or ERCOT, manages about 90% of the state's power for 26 million customers.

During a news conference Tuesday, representatives from ERCOT said there were 45,000 megawatts offline. Of that, 15,000 megawatts were wind and 30,000 were gas and coal.

Supply fell short by about 34,000 megawatts (MW) of energy, according to ERCOT. For comparison, when ERCOT restored 2,500 MW on Monday, that was enough power to serve 500,000 households.

At the most basic level, the outages have been caused because demand amid the bitter cold has outpaced the supply of energy used to heat and power homes, said Daniel Cohan, an associate professor of civil and environmental engineering at Rice University.

A combination of mostly natural gas, some coal and a nuclear power plant failed to meet customers' demand, Cohan said.

ERCOT said it is instituting rolling outages across the system to prevent more outages as it worked to restore power for Texans.

Gov. Greg Abbott called the situation "unacceptable" and said he would add an emergency item to the state's legislative session on reforming ERCOT. The nonprofit corporation is subject to oversight from the Public Utility Commission of Texas and the Legislature.

"Far too many Texans are without power and heat for their homes as our state faces freezing temperatures and severe winter weather," Abbott said.

Cohan said three factors were probably at play, though it's too soon to say to what degree each played a role in causing the outages.

- First, some power plants may not have been operational during routine maintenance, Cohan said. Peak demand typically occurs in the summer, so it's not unexpected for a coal or natural gas plant to be offline in an effort to tune up for the warmer months.

- Second, some power plants may have failed to operate in the cold, Cohan said. "Plants are optimized to run under our typical and our extreme summer conditions, but they aren't as well prepared and engineered for extreme cold," he said.

According to Rai, if plants operate for too long in too extreme conditions, it could be too costly to operate and equipment might be damaged, which could exacerbate the outages for longer periods of time.

- Third, some natural gas plants may not have been able to get adequate supply of gas to be converted into electricity, Cohan said. Unlike a coal plant that has a ready stockpile, natural gas plants don't store as much on site, meaning any disruption at the supply source will lead to a disruption in turning on the lights.

Carey King, an assistant director and research scientist at the Energy Institute at the University of Texas-Austin, said it's possible that power outages at natural gas production sites led to failures in the electric compressors that move the gas.

"This is far beyond what the power system operators expected, a far deeper freeze and a far worse performance from our natural gas power plants than anyone anticipated," Cohan said.

To help offset potential outages, ERCOT told customers Sunday to conserve power by turning down thermostats, turning off and unplugging appliances and lights and avoiding using large appliances.

Rai said conservation was necessary to lessen the problem, but the issue was not at the margin. "The reality is very, very large. Thirty to 50% of capacity in parts of Texas went down," he said. "You're not out 5-10% of the power."

ERCOT said it was implementing rolling blackouts Monday "to protect the electric grid from uncontrolled, cascading outages."

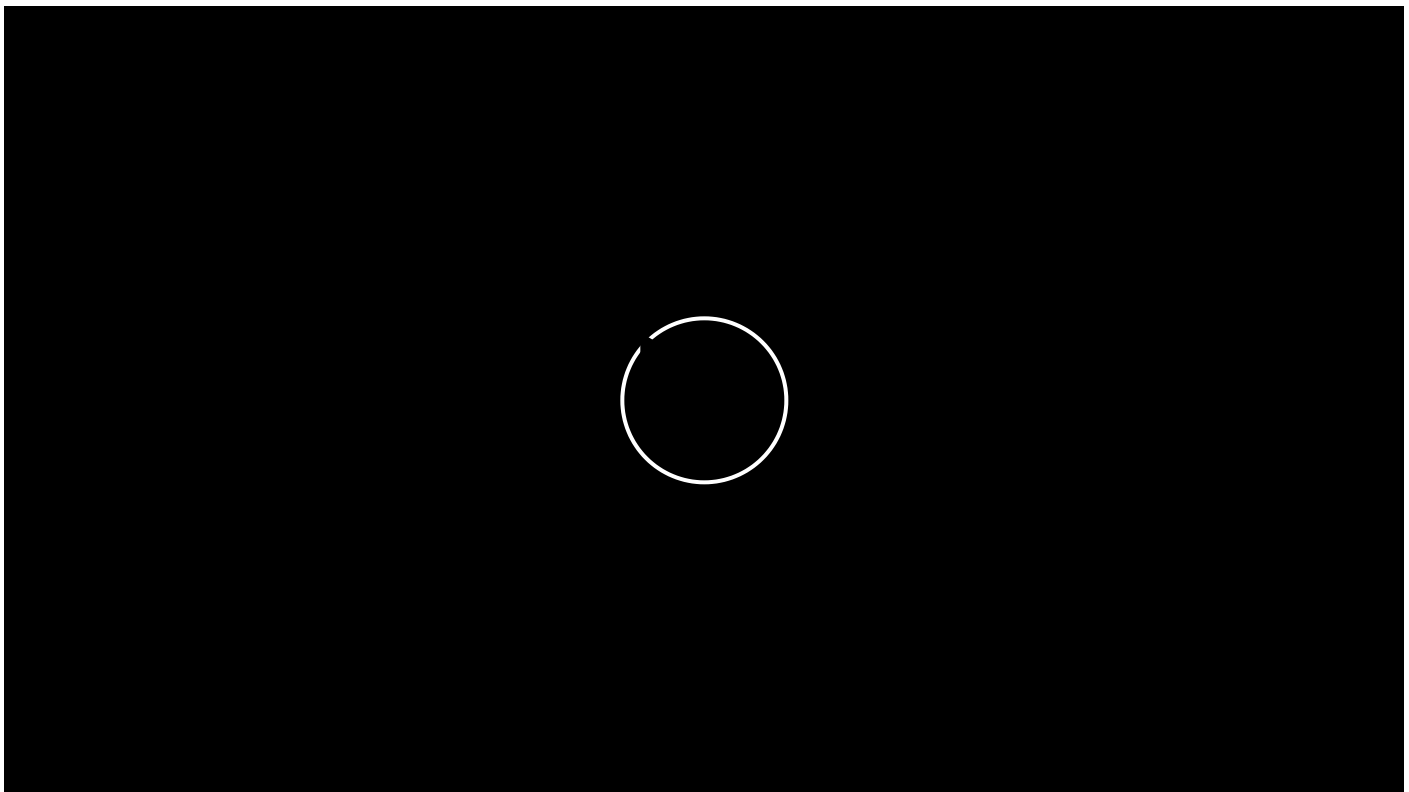
Instead of the outages being spread across neighborhoods in shorter intervals, some areas have lost power for days while others have kept it the entire time, Cohan said.

Some have pointed to freezing on wind turbines as a potential cause of the widespread outages, saying the renewable energy source is not reliable, but Cohan called those arguments "a red herring."

Rai said there are times of the year when wind is an extremely important energy source for Texas, powering half of the state's electricity supply.

This week, operators planned for much less wind capacity, in the range of 6,000 megawatts, Cohan said.

"Firm resources" – such as gas, coal and nuclear – failed to supply roughly 30,000 megawatts, which contributed to the bulk of the problem, Cohan said.



Drone footage shows how major Texas cities look covered in snow

A record-breaking winter storm continues to dump snow on the state of Texas.

In 2011, a similar deep freeze event caused widespread power outages in Texas, but the extent was not as great, Cohan said.

Grid operators learned some lessons from that experience and made adjustments, but they clearly underestimated that demand could rise even higher, Cohan said.

Cohan said issues on the supply side better explain what happened. "I think there wasn't enough planning for how interdependent our natural gas and electricity systems were."

Every summer during peak demand, the grid's reliability comes into question, Rai said, so it shouldn't be a shock that there could be a weather event that caused so much disruption.

Read more: [Why is Texas one of few states with its own power grid?](#)

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Even though it occurred in the winter, there should be better planning, he said.

Though climate change typically is thought of as leading to warmer temperatures, scientists suspect it could also cause more unpredictable and severe weather. Blaming the failures on this cold being a one-in-30-years weather event is not an excuse, knowing that those events could become more common, Rai said. "Why are we only thinking about 30 years as a society?"

"One solution is if you can have capacity that is designed for conditions like this," Rai said.

King, of the Energy Institute, said incentivizing power plants to better weatherize should also be prioritized.

Though having that energy capacity is costly, two power outage events in 10 years because of the cold show it is necessary, he said.

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